OC-6 File

RS-6 PRODUCTION TEST SPECIFICATION

14 November 1952

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RS-6 PRODUCTION TEST SPECIFICATION

1. Specification 50-A-1006-A with Amendments I through VII and Technical Action Request #1 shall govern the production limits and tolerances of the Radio Set RS-6, being manufactured by [redacted] under Contract PSC-148-UNV. 25X1

2. The various categories of test are deliniated by this specification and the points of measurement defined, together with the acceptable limits and magnitudes.

3. Inspection, according to paragraph 2.4. of specification 50-A-1006-A, shall be made of all assemblies, panels, and units to insure acceptable hook-up, quality, soldering and proper lead dress. Emphasis shall be placed upon workmanship. The following major inspection points are to be stressed:

3.1. All soldering or solder joints must be firm and smooth. Soldering must be clean and there must be no loose solder in units and absolutely no solder splatter. Cold solder joints, rough pig tails at tie points, solder lugs or junction points will not be tolerated. All solder lugs must be soldered and dressed to assure no possibility of shorts or malfunctions.

3.2. Lead dress shall be such as to prevent any possibility of fracture to wiring or to interfere with moving parts. Acceptable sleeving, lacing or clamps may be used by mutual agreement of Naval inspector and [redacted] Fractured, torn, frayed, broken, burned or otherwise mutilated wiring shall not be acceptable. 25X1

3.3. Component parts shall be securely mounted and shall have all necessary retainers, clips, rings, lock washer, etc. where specified. All components shall be secured and mounted in such a manner as to perform the desired function properly without interference or malfunction to any other component.

3.4. At the time of inspection and also when units are shipped, the units must be complete with all accessories and components as specified.

3.5. All controls, switches, tuning mechanisms, verniers, contacts, plugs, cables, jacks or sockets must perform desired function to satisfaction of inspector. No binding, sticking, misalignment, or any other form of malfunction will be tolerated.

4. The production testing shall be broken down into the following three main categories:

(a) Phasing Tests
(b) Final Tests
(c) Quality Control Tests

Phasing and final testing shall be conducted by the Contractor and Quality Control testing by the Navy Inspector.

4.1. Phasing Tests

4.1.1. RR-6 Receiver: Each and every RR-6 shall be tested for:

4.1.1.1. I. F. Selectivity

4.1.1.2. I. F. Rejection

4.1.1.3. Image Rejection

4.1.1.4. R. F. Sensitivity (CW)

4.1.1.5. Dial Calibration Accuracy

4.1.2. RT-6 Transmitter: Each and every RT-6 Transmitter shall be tested for:

4.1.2.1. R. F. Power Output

4.1.2.2. Monitor Operation

4.1.2.3. Hand Key Operation

4.1.3. RP-6 Power Supply and RA-6 Filter Unit. Each and every RP-6 and RA-6 shall be tested for:

4.1.3.1. Operational Output Voltages

4.1.3.2. Battery Charging Current

4.1.3.3. Vibrator Buffering Closure

4.2. Final Tests

4.2.1. RR-6 Receiver. Each and every RR-6 shall be tested for:

4.2.1.1. R. F. Sensitivity

4.2.1.2. Dial Calibration Accuracy

4.2.1.3. Noise Level

4.2.1.4. Signal to Noise Ratio

4.2.1.5. Air Test (reception of WWV, crystal operation)

4.2.1.6. Crystal Sensitivity

4.2.2 RT-6 Transmitter. Each and every RT-6 shall be tested for:

4.2.2.1. R. F. Power Output (AC and DC Operation)

4.2.2.2. Keying Waveforms

4.2.3. RP-6 Power Supply and RA-6 Filter Unit. Each and every RP-6 and RA-6 shall be tested for:

4.2.3.1. Battery Charging Rate

4.3. Quality Control Tests: These tests shall be conducted after tests as required in paragraph 4.1. and 4.2. have been performed.

4.3.1. RR-6 Receiver. Tests 4.3.1.1. through 4.3.1.9. shall be made on 5% of the units. Tests 4.3.1.10 through 4.3.1.13 shall be made on 1% of the units.

4.3.1.1. I. F. Selectivity

4.3.1.2. I. F. Rejection

4.3.1.3. Image Rejection

4.3.1.4. R. F. Sensitivity

4.3.1.5. Dial Calibration Accuracy

4.3.1.6. Noise Level

4.3.1.7. Signal to Noise Level

4.3.1.8. Crystal Sensitivity

4.3.1.9. Audio Distortion

4.3.1.10. Audio Response

4.3.1.11. Antenna Input Impedance

4.3.1.12. Cross Modulation

4.3.1.13. Local Oscillator Radiation

4.3.2. RT-6 Transmitter. Tests 4.3.2.1. and 4.3.2.2. shall be conducted on 5% of the units and test 4.3.2.3. shall be conducted on 1% of the units:

4.3.2.1. Power Output (AC and DC operation)

4.3.2.2. Transmitter "B" Current

4.3.2.3. Harmonic Radiation

4.3.3. RP-6 Power Supply and RA-6 Filter Unit. Test 4.3.3.1. shall be conducted on 5% of the units and tests 4.3.3.2. and 4.3.3.3. shall be conducted on 1% of the units:

4.3.3.1. Battery Charging Rate

4.3.3.2. Conducted Hash on the Battery Cables.

4.3.3.3. Radiated Hash

5. Test Limits

5.1. RR-6 Receiver. The Standard Test Conditions shall prevail as per paragraph 4.6. of Specification 50-A-1006-A as amended.

5.1.1. Sensitivity

The sensitivity shall be less than 20 uv AM and less than 15 uv CW. The ratio of sensitivity variation shall be less than 3:1 over either band. The method of measurement as outlined in paragraph 4.6.2.2. of specification 50-A-1006-A shall be complied with. Sensitivity measurements shall be taken at 3.0, 3.5,4.5, and 6.5 mcs. on the low band and 6.5, 10.0, 14.0, and 15.0 mcs. on the high band.

5.1.2. Signal to Noise Ratio

The CW signal to noise ratio shall be less than 1.5 uv and the AM signal to noise ratio shall be less than 2 uv. Measurement shall be in accordance with paragraph 4.6.3.2. of specification 50-A-1006-A. Readings shall be taken at 3.5 and 7 mcs.

5.1.3. Image Rejection

The image rejection rationshall be greater than as shown below and shall be measured in accordance with paragraph 4.6.7.2. of specification 50-A-1006-A.

Frequency mcs.	Rejection db
3	60
6.5 low band	40
6.5 high band	40
15	27

5.1.4. I. F. Selectivity

The I. F. band width at the following values of attenuation shall be less than the following:

Attenuation db	Frequency kc
10	3.3
20	5.5
40	10.3
60	16.0

The carrier modulation shall be 400 cps.

5.1.5. I. F. Rejection

The I. F. rejection shall exceed 80 db at all points of the tuning range and shall be conducted in accordance with paragraph 4.6.6.2. of specification 50-A-1006-A. The I. F. rejection shall be taken at 3 and 6.5 mcs (high band) for the Phasing Tests and at the additional frequencies of 6.5 (low band) and 15 mcs during Quality Control Tests.

5.1.6. Dial Calibration

The dial calibration of the high frequency band shall be within plus or minus 50 kc at all frequencies up to 14 mcs and within plus or minus 100 kc between 14 mcs and 15 mcs. The dial calibration of the low band shall be within plus or minus 50 kc be between 6.5 and 6.8 mcs and plus or minus 25 kc from 3 to 6.5 mcs. The above measurements will be conducted with the fiduciary at zero i.e., the hairline in the center of the calibrating circle. There shall be sufficient range in the fiduciary to correct the error at 15 mcs and 6.7 mcs. The navy inspector shall check the error limit curve used for compliance with the above limits. The dial calibration shall be checked every 500 kc.

5.1.7. Noise Output

The maximum noise output shall not exceed .02 mw at any frequency on either band. The method of test shall be in accordance with paragraph 4.6.4.2. of specification 50-A-1006-A.

5.1.8. Crystal Sensitivity

The sensitivity of the RR-6 on crystal control shall be less than 20 uv on the fundamental, 30 uv on the second harmonic and 60 uv on the third harmonic. The above figures are AM sensitivity and the test shall be conducted in accordance with paragraph 4.6.2.2.1. of specification 50-A-1006-A.

5.1.9. Audio Response

The frequency response of the audio system shall be within 9 db from 200 to 3000 cycles. At least eight separate readings shall be taken over this range.

5.1.10. Antenna Impedance

The antenna input impedance shall be within the limits of 100 to 400 ohms and may be measured by the voltage ratio method, Measurements shall be taken at 3.5, 5.0, 6.5 mcs on the low band and 6.5, 11, and 15 mcs on the high band.

5.1.11 Cross Modulation

The Cross Modulation distortion products ratio shall not exceed 85 db at any frequency of either band. The method of measurement shall follow paragraph 4.6.10.2. of specification 50-A-1006-A. Frequencies used shall be at 7 and 4 mcs.

5.1.12 Audio Distortion

The total Amplitude Distortion shall not exceed 15% and shall be measured in accordance with paragraph 4.6.5.2. of specification 50-A-1006-A.

5.1.13 Local Oscillator Radiation

The radiation from the RR-6 high frequency oscillator shall not exceed the following:

a.	high band	3500 microvolts/meter
b.	low band	1000 microvolts/meter

Measurements shall be taken in accordance with JAN-1-225 at 3.0 and 6.5 mcs on the low band and 6.5, 11, and 15 mcs on the high band.

5.1.14 Air Test

This test is designed to check for intermittent RR-6 receiver crystal sockets. The receiver shall be tuned to station WWV - normal operation. A crystal shall be plugged in the crystal socket of such a frequency as to bring in the same WWV station. The antenna shall be connected to the RT-6 and jumped to the RR-6.

5.2. Transmitter Tests

5.2.1. R. F. Power Output

The R. F. power output shall not be less than that shown in the following tables. Power output measurements taken during phasing tests shall be conducted with a plate, voltage of 400V. Final test, power output measurements, shall be taken in accordance with Table I, the limits being set by Table II. Quality control tests shall be conducted for both AC and DC operation according to Table II.

TABLE I

TRANSMITTER UNIT POWER OUTPUT

Frequency	Harmonic	Band	ohms 75	150	ohms 300	600	1200
I 3 mc	Fundamental	low	DC	DC	DC	DC	DC
II 6	2nd	low	DC	AC	AC	AC	AC
III 9	3rd	high	DC	DC	DC	DC	DC
I 5.5	Fundamental	low	DC	AC	AC	AC	AC
II 11	2nd	high	DC	AC	AC	AC	AC
III 16.5	3rd	high	DC	DC	DC	DC	DC
I 7	Fundamental	low	DC	AC	AC	AC	AC
I 7	Fundamental	high	DC	AC	AC	AC	AC
II 14	2nd	high	DC	DC	DC	DC	DC

D.C. reading, shall be those RT-6 power output readings taken when the system is operating on a 6 volt battery.

A. C. readings, shall be those RT-6 power output readings taken when the system is operating from 120V AC mains.

TABLE II

TRANSMITTER POWER OUTPUT - MINIMUM ACCEPTABLE LIMITS
AC operation at 120 volt position of Power Selector Switch.
Plate voltage - 400 DC, Filament voltage - 6.3 VAC

Frequency Band	75	150	300	600	1200	ohms.
I 3.0 mc low	7.0	8.0	8.0	8.0	8.5	
II 6.0 low	9.5	10.0	10.0	10.0	10.0	
III 9.0 high	6.0	6.0	6.0	6.0	6.0	
I 5.5 low	9.5	10.0	10.0	10.0	10.0	
II 11.0 high	7.0	7.0	7.0	7.0	6.5	
III16.5 high	7.0	7.0	7.0	6.0	6.0	
I 7.0 low	9.0	9.0	9.0	9.0	7.0	
I 7.0 high	5.5	5.5	6.0	6.0	5.5	
II 14.0 high	8.0	8.0	7.0	6.0	6.0	

DC Operation at 5.7 volts at center top. Plate voltage, 368 V DC.

Frequency Band	75	150	300	600	1200	ohms.
I 3.0 mc low	5.5	6.0	6.0	6.0	6.0	
II 6.0 low	6.7	6.7	6.7	6.7	6.7	
III 9.0 high	4.0	4.0	4.0	4.0	4.0	
I 5.5 low	6.7	6.7	6.7	6.7	6.7	
II 11.0 high	4.65	4.65	4.65	4.65	4.65	
III16.5 high	4.0	5.0	4.0	4.0	4.0	
I 7.0 low	6.7	6.7	6.7	5.3	5.0	
I 14.0 high	5.3	5.3	4.65	4.0	4.0	

5.2.2. Harmonic Radiation. The RT-6, R.F. harmonic radiation shall not exceed 12% on the second harmonic, 5% on the third and higher harmonics, for the low band operation and 5% on the second and 1% on the third and higher harmonics on the high band, The harmonic radiation intensity shall be compared with the fundamental using a field strength meter in accordance with paragraph 3.9.1.7. of specification 50A-1006-A. The load impedance shall be 1200 ohms.

5.2.3.1

5.2.3. Keying Wave Forms.

The RT-6 keyed wave form shall meet the characteristics required in paragraph 5.3.7.2. of specification 50-A-1006-A.

5.3. RP-6 and RA-6, Power Supply and Filter Unit Tests.

5.3.1. RP-6 and RA-6 Operational Output Voltages.

The RA-6 shall be connected to the RP-6. RR-6 and RT-6 equivalent loads shall be applied to the RA-6 and the RP-6 connected for A.C. operation. For each tap voltage 70 through 270 volts the following requirements shall be met. The receiver plate voltage shall not exceed 105 V at 40 ma. The receiver plate voltage shall be regulated. The ripple voltage shall be less than 2% of the plate voltage. The transmitter plate voltage shall not exceed 420 volts under the conditions of A.C. operation nor be less than 368 volts under battery operation. The ripple voltage under battery operation shall not exceed 1% of the plate voltage. The battery voltage as measured at the center tap of the transformer shall not be less than 5.7 volts, when the battery voltage is 6 volts.

5.3.2. Battery Charging Current.

The output of the battery charging selenium rectifier shall be at least 3.5 amperes when delivering to a 6 volt storage battery whose electrolyte has a specific gravity figure of 1180. A dummy load may be used if the contractor submits data to substantiate the equivalence of the load used.

5.3.3. Conducted noise.

The conducted noise on the battery cables shall not exceed the following maximum values:

Frequency	Max. Equiv. Noise
100-400 kc	1000 microvolts
400-500 kc	1000 "
500-2000 kc	100 "
2 mcs - 20 mcs	25 "

5.3.4. Radiated Noise.

The radiated noise field strength, with the rod antenna at a distance of 1 foot from any unit of the equipment, shall not exceed the following values in microvolts/meter.

100-400 kc	1000 μv/meter
400-500 kc	500 μv/meter

500-2000 kc	100 μv/meter
2 mcs - 20 mcs	25 μv/meter
20 mcs - 40 mcs	25 μv/meter

At least one measurement shall be made within each of the frequency ranges above for both radiated and conducted interference. The measurements shall be conducted in accordance with para. 6.3.3.1. of specification 50-1006-A.

5.3.5. Hash Level.

The maximum value of noise shall not introduce a greater amount of hash into the receiver than the equivalent of one microvolt test signal, modulated 30% at a frequency of 400 cycles.

5.3.6. Vibrator wave form.

The vibrator wave form closure shall be at least 65%.

6. Quality Control.

The sampling procedures in the quality control inspection by the Navy Inspector may be instituted at his discretion but not before four complete consecutive lots of 75 sets have been delivered to the Navy Inspector having no critical or major defects. Prior to this time, inspection for critical and major defects and the inspection for workmanship shall be on 100% of all equipments.

6.1. Quality Control shall be conducted by the Navy Inspector in accordance with MIL-STD-105A, entitled "Sampling Procedures and Tables for Inspection by Attributes" The total production of 6000 units shall be divided into lots of 75 units. Seven samples shall be drawn at random from each lot. The acceptable quality level shall be ten (10), see Table IV-A.

6.2. The following is a list of Critical Defects. The occurance of one critical defect in the complete sample of seven units shall be cause for the rejection of the lot. Treatment of rejected lots is covered in paragraph 12 of the Quality Control Specification. However, any set rejected by the Navy Inspector in his quality control inspection, if resubmitted by the Contractor, must be resubmitted as an individual set and not part of a lot of 75 units.

6.2.1. Shorted or open plugs or receptacles.

6.2.2. Shorted or open plate voltage or filament lines

6.2.3. No receiver sensitivity, either on crystal control or VFO operation.

6.2.4. No transmitter power output.

6.3. The following is a list of Major Defects: The occurance of a total of two (2) major defects in the complete sample of seven units, shall be cause for rejection of the lot.

6.3.1. Transmitter output lower than 20% below the limits set in paragraph 5.2.1. of this specification.

6.3.2. Receiver sensitivity on either crystal control or VFO operation greater than 20% of the limits set in paragraph 5.1.1. and 5.1.8. of this specification.

6.3.3. Instability of any kind in the receiver.

6.3.4. Failure of the equipment to perform the functions of break-in operation required in paragraph 5.1.2.1. of specification 50-A-1006-A. The break-in relay must also switch the antenna from the receiver to the transmitter and vice-versa in performing the functions required by paragraph 5.1.2.1. of Specification 50-A-1006-A.

CONFIDENTIAL

53 186

AMENDMENT I TO THE RS-6 PRODUCTION TEST SPECIFICATION

DATED 14 NOVEMBER 1952 .

20 November 1952

1. The following paragraphs of the RS-6 Production Test Specification are hereby modified to read as follows:

Paragraph	Line	Action	
5.3.3.	5	delete add	"1000 microvolts" "5000 microvolts"
5.3.4.	8	delete add	"25 microvolts/meter" "250 microvolts/meter"

NOTE: The title line of a paragraph shall be considered as line 1